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ABSTRACT

This study assessed the effect of an alternative delivery system using microcomputers. All 19 students enrolled in the University of Georgia's off-campus curriculum development course were assigned to the experimental group, and all 16 students taking the same course on campus were assigned to the control group. All students were vocational teachers in secondary, postsecondary, and correctional institutions. None of the experimental group students used microcomputers for communications, and 14 had never used computers before. Five of the group owned computers, and the rest were loaned computers for the study. Both groups received competency-based instructional modules with a packet of supplementary references materials. The control group met 12 times, was instructed in the conventional mode, and completed assignments in the traditional manner. The experimental group was instructed on how to use the computer for communications and attended six regular classes to receive additional instructional materials. At the end of the course, 48 percent of the experimental group were in favor of taking courses by microcomputer and 37 percent were undecided. Three students who were opposed were among those who had no prior experience with computers. The cost of providing an off-campus microcomputer course was 34 percent less than via the traditional delivery system. Data showed no significant differences in student perceptions of instructor effectiveness, midterm scores, and final exam scores between students in the control and experimental groups. (CML)

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USING COMPUTERS TO PROVIDE DISTANCE LEARNING THE NEW TECHNOLOGY

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USING COMPUTERS TO PROVIDE DISTANCE LEARNING:

THE NEW TECHNOLOGY

A major issue, needing resolution, is whether learning is perceived by students and university faculty as occurring when using a delivery system that differs significantly from the traditional and time honored method of face-to-face instruction. Faculty members, content with the traditional approach, argue that there is a danger in the use of technology, believing that it is impersonal and less effective than the traditional delivery system. Others contend that the greatest danger resides not in attempting to try the new technology and failing, but in failing to try. Maxcy and Maxcy (1986) found that students using computer technology in distant learning activities rated both the technique and the instructor significantly higher than students in the same course with the same instructor in the traditional face-to-face approach.

Hashway (1986), described communicating as the "process of moving ideas from one mind to other minds." For most of us that statement also defines the act of teaching! It would appear that any vehicle that can move information between people may be a viable process to be utilized for communication and consequently utilized for teaching.

Traditional delivery systems for off-campus courses are taught by sending an instructor from the university to the off-campus site. This system requires that the instructor be away from the office for lengthy periods of time. In Georgia, some off-campus sites are more than five hours driving distance from the university campus. Time needed for driving, teaching, and meals often force the instructor to stay overnight, adding to the costs associated with off-campus teaching activities.

A major question that needed an answer was: Is there a viable alternative to delivering teacher education courses to a population of students who live and work more than two hours driving time from campus than the traditional delivery system?

To attempt to answer that question, a pilot study was undertaken in the Spring Quarter of 1987. The intent was to assess whether an alternative delivery system using microcomputer technology could be implemented to reduce off-campus course offerings without adversely affecting student learning. All students who enrolled in the Curriculum

Development course off-campus were assigned to the experimental group, while all student who took the same course on-campus were assigned to the control group. The review of the literature indicated that cyberphobia, or fear of computers, would be a factor in getting the experimental group (inexperienced computer users) to try the new technology. Foell (1984) had found that inservice teachers were more resistive to utilizing a microcomputer for classroom use than were preservice teachers without prior teaching experience. The pilot study described in this article was completed with inservice teachers.

Purpose of the Study

The purpose of the study was to determine if an alternative delivery system would:

1. be able to employ computer telecommunication technology with a population of students who had no prior experience with computers.
2. be perceived as being educationally effective by the students and faculty.
3. be cost-effective when compared by the traditional off-campus delivery system.

Method

The University of Georgia, College of Education, provided the pilot study with access to a host computer through the UGA Exchange Board. The Exchange Board uses an IBM microcomputer with a 30 megabyte hard disk containing four microprocessor cards. Four callers can access the Exchange simultaneously with no effect on the speed of the operation or availability of Exchange features. A toll free phone number, accessible from anywhere in Georgia is available. The Exchange is in operation seven days a week, twenty-four hours a day. For this study, the College of Education also provided modems and portable microcomputers for student use. The Exchange Board System Operator (SYSOP), provided the technical expertise to develop a special conference area within the host computer's Bulletin Board Program. Entry into the conference area was limited to those students registered in the off-campus course. A Trade & Industrial library section was established to provide the students the opportunity to access reference materials via the computer. A Teacher Education Directory was also made available for downloading files and useful public domain programs.

To assess both the level of prior computer experience and to gather data on the perceptions held by the students on the use of the microcomputer, a survey instrument was developed. Data were also gathered to analyze the costs associated with the traditional and alternative delivery systems. Five items from the standard faculty evaluation form were selected as pertinent in comparing the students perceptions of the effectiveness of the two modes of delivering instruction.

Population

The experimental group consisted of nineteen students who were enrolled in the non-traditional delivery system. The control group consisted of sixteen students who were enrolled in the same course at a different site, taught by the same instructor. The students taught vocational education courses in the secondary, post-secondary, and correctional institutions of Georgia.

Table 1 Summary of experimental group's prior computer experience.

Years of Experience With a Microcomputer	Number of Students
3 years	0
2+ years	2
1+ year	2
less than 1 year	1
0 years	14
Total	19

Mean = .36 years of experience.

Only five members of the experimental group owned their own computers. Some had access to a computer at the school in which they taught. The rest were loaned microcomputers by the College of Education. None of the students had experience using a computer as a communication device prior to the offering of the course. Fourteen had never actually used a computer!

Procedures

Resource persons were identified to provide support for the following activities.

1. Interaction with the host computer (SYSOP).
2. Interaction with faculty.

3. Interaction with state-level personnel.

4. Interaction with local-level administrators.

The resource persons agreed to be members of the computer conference area, allowing students to contact them with questions related to the course content and/or technical problems. The resource persons were to check into the host computer on a regular basis.

Students in both the experimental and control groups received competency-based modules with a packet of supplementary reference materials. Depending upon their individual needs, the experimental group were provided with either an IBM compatible microcomputer with a built-in modem, or a variety of different modems to attach to the different microcomputers they owned or to which they had access. Communication software was provided for all of the computers. All course materials and equipment were distributed during the first regular scheduled class in the Spring of 1987.

In the first class session the experimental group was given a short introduction in using the computer for communications. A handout, explaining the function keys, screen displays, and procedures for logging on and off the host computer was given to each student. They were also provided with written instructions for a simple, user friendly, ASCII text editor to use as a basic word processor. A short question and answer session followed to allow the students an opportunity to express any concerns related to completing the course. No attempt was made to teach any computer programming or technical aspects of the computer.

During the training session for the experimental group, a computer was connected to a telephone line. The toll free number was used to dial the host computer at the University of Georgia. Each student was given entry into the T&I conference area and then encouraged to interact within the conference area. Messages were sent back and forth among the students. Within a few hours, each student had logged in several times and was able to enter and retrieve data from the message base. Getting their own text files created, uploaded, and downloaded was another matter and required frequent use of the message base during the first two weeks of the course. A public domain text editor was chosen

because of the low front-end learning time needed to create ASCII text files. The text is readily transmitted over telephone lines and can be printed as alpha characters on monitors using asynchronous communication modems. It was as simple to use as a typewriter. To save the text file to the disk, the student only had to press one function key and select the option key from the menu. The file was saved on the disk under the filename given it by the student. The file then could be uploaded to the host computer.

One obvious advantage of having instructed the students on how to use the message base during the first session was the ability to use the message base to receive additional help on how to upload and download their assignments even though they were more than a hundred miles from campus.

In addition to the instructional materials and interaction available via the computer, students attended regular class meetings six times during the quarter. The classes were held for the purposes of providing additional instructional materials for the competency-based modules, lectures, mid-terms, final exams and the return of the computers.

The control group met a total of 12 times, being instructed in the conventional mode and completing assignments in the traditional manner.

Results

A survey taken in the first experimental class session indicated that nine members of the group were for utilizing the computer for communications, seven were undecided and three were opposed.

Table 2 Pre-survey of the experimental group's perceptions towards using a microcomputer for distance learning by level of previous computer experience.

Pre-Survey	For	Undecided	Opposed	Totals
Prior experience	5	0	0	5
No prior experience	4	7	3	14
Totals	9	7	3	19
Percentage *	48%	37%	16%	100%

* Percentage does not equal 100% due to rounding.

The same survey (Table 2A) taken at the end of the course indicated that fifteen students were in favor of taking coursework in the alternative delivery system and four were opposed. None of the four students who were opposed were from the group of three

students who were originally opposed. In fact, one of the four opposed was from the experienced computer user group and initially eager to try the alternative delivery system.

Table 2A Post-survey of the experimental group's perceptions towards using a microcomputer for distance learning by level of previous computer experience.

Post-Survey	For	Undecided	Opposed	Totals
Prior experience	4	0	1	5
No prior experience	11	0	3	14
Totals	15	0	4	19
Percentage	79%	0%	21%	100%
Percent change	+ 31%	- 37%	+ 5%	

Two of the students who had indicated they were initially against the delivery system were among the first of eight students who purchased their own computer after the class was over.

Table 3 presents data comparing costs associated with the traditional and alternative off-campus delivery systems. It was found that the cost of providing an off-campus course utilizing the microcomputer, vs. the traditional instruction system, resulted in a thirty-four percent reduction in travel expenses. Taken into account were the mileage, meals, lodging and the toll-free 800 number. The equipment loaned to the students was not considered in the cost factor since it is readily available for loan to all faculty and students in the College of Education. The thirty-four percent reduction in providing off-campus instruction in this particular study has major administrative implications for in-service teacher education programs.

Table 3 Direct cost comparisons.

Delivery Systems	800 number*	Mileage @.21/mile	Meals	Lodging	Total	Percent Change (+-)
Traditional (eleven trips)	0.00	554.40	99.00	407.00	1060.40	
Alternative (six trips)	125.00	302.40	47.00	222.00	696.40	- 34.5%

*The 800 number is available up to one half hour daily to anyone in Georgia. Students in the pilot study were given an additional half hour or a total of one hour daily. Costs were prorated on the basis of estimated student contact exceeding one half hour per day.

At the end of the course, a standard University of Georgia course evaluation form was used to measure the perceptions of the students in five selected categories. The control group consisted of sixteen students who took the Occupational Analysis course in the traditional manner. The experimental group consisted of nineteen students taking the same course in the non-traditional approach.

Table 4 Perceived effectiveness of the courses using the mean scores of five selected items from the standard University of Georgia course evaluation form.*

Evaluation Item	Control Group (N=16)	Experimental Group (N=19)	Range
1. What was your interest in subject prior to taking this course?	3.50	3.46	3 - 5
2. The instructor was willing to give assistance outside of class.	3.87	4.90	3 - 5
3. The instructor encouraged students to think for themselves.	4.23	4.97	4 - 5
4. How would you rate the overall value of the course?	4.34	4.84	4 - 5
5. How would you rate the teaching ability of this instructor?	4.21	4.53	4 - 5
Mean of sum of scores =	4.03	4.54	

* Where 1=poor 2=fair 3=average 4=above average 5=superior.
U was not significant

The Mann-Whitney U-test was used to statistically test for significance. No significant differences were found between the perceptions of the control and experimental groups towards instructional effectiveness when compared by results obtained from the five selected items on the standard evaluation form. No differences were noted on the average overall class scores on either the mid-term or the final examinations using the exact same examination instruments.

Discussion

This paper outlines one way to delivering off-campus instruction. The purposes were to determine if a computer-assisted delivery system would:

1. be able to employ computer telecommunication technology with a population of students who had no prior experience with computers.
2. be perceived as being educationally effective by the students and faculty.
3. be cost-effective when compared by the traditional off-campus delivery system.

There were no significant differences in the student perceptions of the instructional effectiveness of the non-traditional vs. the traditional courses. This result suggests that each system of delivery was perceived by the students to be at least equal in effectiveness to the other. Costs were thirty-four per cent (34%) less for the computer assisted delivery system of teacher education. This was due to the fact that less trips were required, resulting in lower travel expenses. In the study described here, information collected from the students indicated that nine of the students enrolled in this particular non-traditional course because of the mode in which it was offered.

The College of Education has often cancelled classes with less than fifteen students enrolled and it is suspected that this may have occurred if only ten students had enrolled. That factor was not considered in this study since it could not be proved to be absolutely true. If it were true, the cost-effectiveness would be even greater for the non-traditional approach. Administrators should consider this factor in considering how to deliver off-campus instruction.

On-going research will continue to exam alternative delivery systems for off-campus instruction. Ways of enhancing distance learning via the microcomputer have already been identified and the most promising of them will be incorporated into future courses offered in this manner.

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